

Evaluating sustainable UK social housing projects: An exploration of current practice

Abstract

Purpose – This paper assesses the selection and use, in practice, of appraisal frameworks regarding sustainability evaluation in UK social housing sector projects, which have been advocated by academics as a means of ensuring that business decisions related to potential built environment projects are driven by best value rather than lowest cost. It also seeks to identify the key features of sustainability as assessed at the project feasibility stage. The research context is housing regeneration projects undertaken by UK social housing providers.

Design/methodology/approach – Using a quantitative approach, a survey was conducted of 481 built environment professionals working within the UK social housing sector, which generated an overall response rate of 24%.

Research Limitations/implications – The methodological approach adopted failed to uncover fully the reasons why practitioners selected particular types of sustainability appraisal toolkits.

Findings - The survey results revealed that few toolkits and models developed by academe to facilitate the development and evaluation of sustainability-led building projects have so far been adopted. The impact of organisational factors such as size, denomination, and maturity on the frameworks was analysed and, in general, no statistically significant relationship was found between organisational features and the models in use. The principal features of sustainability were found to be related to energy efficiency and asset life expectancy. These findings have implications for the UK construction industry's commitment to enhancing the built environment's sustainability and thereby stakeholder prosperity.

Implications – This paper focuses on the current use of sustainability-led project appraisal models and the key features of sustainability whilst also providing directions for further research. It explores the adoption of sustainability-focused project evaluation practices in the UK social housing sector and outlines potential areas for further research, focused on developing a usable, holistic framework for evaluating sustainability during the early stages of project development to help to create a more sustainable built environment.

Keywords - Social Housing, UK, Sustainability

Paper type – Research paper

Introduction

UK social housing projects are conventionally evaluated at an early stage by using investment feasibility models that take account of the present and future cash flows. The processes involved require the accurate prediction of the initial capital costs, operational costs and potential revenue generation associated with the proposed project. It appears that, at the feasibility stage, a more value orientated approach to project evaluation has become increasingly common, that entails the use of models and toolkits incorporating both the component life cycle and whole project life cost appraisal.

This paper argues for the appraisal of sustainable benefits as well as the costs of social housing projects at the project feasibility stage, in order to incorporate the potential benefits of social and economic inclusion within the project's community. The adoption in practice of such a broader sustainability-based benefits approach to early stage project evaluation should be fundamental to any form of public investment in social housing provision in order to promote stakeholder prosperity. This paper reviews the relevant literature related to sustainability, its evaluation and existing feasibility appraisal techniques for social housing projects in order to establish the current state of knowledge. Having analysed the collected data, this paper will outline the current use of sustainability-led project appraisal models and the overarching features of sustainability on which sustainability-led investment appraisal decisions in the UK social housing sector are based.

Literature Review

Sustainability and Sustainable Construction

Sustainable social housing construction project processes must promote economic wellbeing, social inclusion objectives, and environmental responsibility (Langston and Ding, 2001). The economic aspects of sustainable construction projects focus on the importance of stable economic growth within the project's locality, but issues related to fair and rewarding employment as well as competitiveness and trade must also be considered (OGC, 2007). The social aspect of sustainability in construction project processes and their evaluation is linked to local people's needs and the inclusion of all stakeholders in the project design (Cooper and Stewart, 2006). The UK Government resolved to focus on housing projects in order to monitor progress towards the general adoption of these broader sustainable development practices. This led the Homes and Communities Agency (HCA) to adopt 'sustainability' as a criterion for the government funding of potential social housing projects. However, a previous survey of the social housing sector indicated that the term 'sustainability' was poorly understood in this context (Carter and Fortune, 2007).

The Evaluation of Sustainability in the Built Environment

Bichard (2015:11) identified that much research has focused on the frameworks or tools used to assess projects by evaluating environmental, economic and societal factors. One of the most recent attempts, undertaken as part of the EPSRC 'Metrics, Models and Toolkits for Whole life Sustainable Urban Development (SUE-MOT)', suggested that some 600 possible sustainability evaluation methodologies exist, addressing the topic through a highly diverse arrangement of toolkits, definitions, conceptualisations and frameworks (Horner, 2004; Levitt-Therivel, 2004). In an attempt to unpack this array of highly diverse methodologies, Ding (2005) and Gasparatos *et al* (2007) proposed that the theoretically available methodologies should be classified as follows:

- *Monetary Tools* – Existing monetary models with strong theoretical foundations in welfare and environmental economics (Turner *et al* 1994).
- *Bio-physical models* – Ecological and environmental models developed within the theoretical boundaries of the natural sciences.
- *Sustainability Indicators and Composite Models* – value related, composite models which include indicators and some form of aggregating mechanism. Poston *et al* (2010) observe that these models are often grouped under the heading *sustainable assessment frameworks*.

Brandon and Lombardi (2011:94) determined an evolutionary continuum, intersected by the Bruntland report in 1987, for classifying the sustainability appraisal methodologies, derived from the secondary analysis of Deakin *et al*'s (2002) original survey of BEQUEST network members (part of the European funded *Building Environmental Quality Evaluation for Sustainability* project) which sought to identify the sustainability assessment methods, tools and procedures in regular use by UK and European construction professionals. Brandon and Lombardi's (2011) subsequent analysis highlighted the Bruntland report's pivotal role in triggering a paradigm shift in sustainability and methodology evaluation design. Pre-Bruntland, sustainability evaluation focused exclusively on ascertaining impact, while development was evaluated using monetary tools underpinned by economic theory such as cost benefit analysis, occasionally supplemented by some form of multi-criteria analysis. However, following the publication of the seminal Bruntland report and Agenda 21, calls were made for more integrated decision-making, aligned with the three facets of sustainability, and distinctions began to emerge between the traditional eco-centric evaluation approaches, which focused on nature, the environment and ecology, and the anthropocentric analytical techniques (Rees, 1992). The natural environment was recognised as a fundamental support system for economic and social development, which sparked the exponential growth of both sustainability indicators and composite methodologies, including the 600 identified by Horner (2004) and Levitt-Therivel (2004).

Vanegas (2003) espouses that this continuous development of new, predominantly anthropocentric, sustainability appraisal methodologies resulted in a collection of frameworks providing such varied views of sustainability that they conflicted with each other and so were of little use. Due to this, and other limitations such as their practical inapplicability and incompleteness, Horner (2004) and Levitt-Therivel (2004) concluded that only 103 of the identified 600 methodologies were usable, and Turcu (2013) espoused that only six could realistically be applied in a social housing context.

Essa and Fortune (2008) assert that only the more notable methods and tools should be evaluated together with those relevant to the specific research question. Carter and Fortune (2007), Essa and Fortune (2008), Brandon and Lombardi, (2011), Dixon (2012) Magee *et al* (2012), Slater *et al* (2013) and Turcu (2013) also discussed frameworks for housing-led projects' sustainable evaluation, collectively identifying 34 sufficiently developed methodologies for evaluating sustainability. It was decided to use these frameworks, models, tools and indicators as a benchmark for investigating the potential models used by social housing organisations. The subsequent section focuses on these 34 frameworks.

Monetary Tools for Evaluating Sustainability

A monetary unit is commonly used to compare project alternatives. Fortune and Cox (2005) and Ashworth and Perera (2013) assert that the evaluation of capital and through life expenditure using single point deterministic techniques such as cost planning has always been

the principle mechanism in this regard. Life cycle costing is now widely employed to evaluate proposed building project designs' environmental and economic aspects (Higham *et al.*, 2015). Whilst acknowledging that the majority of construction professionals are now actively promoting LCC as a decision tool for evaluating environmental sustainability, Gluch and Baumann (2004) and Tsai *et al.* (2014) suggest that such appraisals are often limited to considering buildings' energy usage.

The conventional project appraisal methodology employs cost-benefit analysis (CBA) as its main decision-making tool (Ding, 2005, Brandon and Lambardi, 2011, Bichard, 2015), particularly in the public sector, where the extended form of social CBA is recommended for expressing a proposal's value to UK society (Dunn, 2012). CBA is designed to capture the trade-off between the total benefits received by society from a potential project against the anticipated societal costs. The CBA literature, however, suggests that the use of a single objective in the evaluation process, the price mechanism and market transactions, to evaluate the social and environmental costs and benefits is a serious limitation (Spash, 1997, Ding, 2005), with indirect impacts, that are either intangible or have no direct market value such as wellbeing or stronger communities, being seen as secondary or even disregarded in the final analysis due to the immense difficulty associated with pricing these (Vardakoulis, 2013, Bichard, 2015).

Recently, assessment methods such as Social Return on Investment (SORI) have sought to solve the problems associated with using CBA for sustainability evaluation. Initially developed by the Roberts Enterprise Development Fund in San Francisco (Emerson and Twersky, 1996), before being refined by the Harvard Business School (Maughan, 2012) and SORI network in the UK (Nicholls *et al.*, 2012), this methodology still adopts CBA's basic premise, seeking to evaluate the trade-off between societal benefit and project cost, based on monetary values, but does not attempt to attribute monetary valuations directly to intangible outcomes. Instead, SORI translates the intangible outcomes associated with social change into data by identifying the likely outcomes, determining how those might be measured and finally giving them a monetary value based on a suitable financial proxy (Nicholls *et al.*, 2012). Whilst this technique constitutes a crucial development in capturing public and third sector outcomes, there is limited empirical evidence of its use (Millar and Hall, 2013), and several practical and implementation difficulties related to its use have been noted (Darby and Jenkins, 2006, Peattie and Morley, 2008, Bridgeman, 2015).

Indicators and Composite frameworks for Sustainability Evaluation

Academe has produced several value related, composite project evaluation toolkits, indicators and models for integrating policy and practice in order to deliver sustainable construction projects (Carter and Fortune, 2007). However, Carter and Fortune (2007) found that frameworks such as, 'the sustainability policy wizard' (Talbot, 2002); 'the toolkit of indicators of sustainable communities' (Long and Hutchins, 2003) and 'the six steps to sustainable development for the social housing sector' (Housing Corporation, 2004) are too complicated to be implemented with ease in either individual projects or at the strategic portfolio level. The complexity and comprehensiveness of the existing sustainability toolkits mean that social housing providers face must decide which aspects of the guidance are the most relevant and which features of the potential project should be incorporated or rejected at its feasibility evaluation stage.

Carter (2005) listed the following key issues on which project stakeholders should agree when considering a sustainable housing project: design quality, energy efficiency, site selection, funding, transport, supply chain, and recycling. Ding (2005), meanwhile, developed an assessment model that incorporated broad environmental and social issues into the decision-making process, although his proposed sustainability index model differed from the toolkits indicated above due to being based on only four criteria: financial return, energy consumption, external benefits, and environmental impact. It also depended on the project stakeholders using a weighting mechanism to establish a potential solution's sustainability. Ding and Carter's proposed models, although diverse, attempted to overcome the aforementioned limitation by reducing the number of sustainability factors that project stakeholders needed to consider during the project feasibility stage.

Other more regulatory and commercially focused toolkits have emerged, such as the Eco Homes assessment framework (BRE, 2006), BREEAM Domestic Refurbishment, BREEAM Eco-homes XB and Code for Sustainable Homes (CSH) (Communities and Local Government, 2010) although the latter has subsequently been withdrawn. BRE's range of domestic assessment frameworks provides a way to evaluate UK housing projects' sustainability, aiming to balance project environmental performance with quality of life indicators. The environmental strands of sustainability that the framework assesses are grouped into seven categories: energy; water; pollution; materials; transport, ecology and land use; health and wellbeing. The CSH framework lists nine categories: (i) energy, (ii) CO₂ emissions, (iii) water, (iv) materials, (v) surface water run-off, (vi) waste, (vii) health and wellbeing, (viii) pollution, (ix) ecology. However, the environmental focus and use of a total aggregate score to allocate an overall rating as part of the old CSH and BREEAM Residential Refurbishment frameworks raises concerns about their robustness and has led to criticism that the practical use of these may mask certain unsustainable aspects of development and, in extreme cases, lead to unsustainable solutions being erroneously deemed sustainable (Wilson and Smith, 2005, Rees 2009). Rees asserts that, whilst the median family size has reduced, the demand for space has increased by a factor of three, which these appraisal techniques fail to incorporate. As a result, potentially oversized buildings, which require significantly more natural resources, would still be rated as "sustainable" as they utilise sufficient quantities of technologically advanced material when, in fact, all that has happened is a trade-off between quality and quantity, so that any environmental benefits will be neutralised. Yet, supporters of the BREEAM framework, such as Reed *et al* (2009), assert that these models provide an excellent proxy for enhanced sustainable development within the built environment. Similarly, Schweber's (2013) appraisal of eight independent projects drawn from a cross-section of different building types suggests that the BREEAM framework is not only embraced by built environment professionals, but has also inspired project teams to debate aspects of sustainability that would otherwise have been overlooked, a process which Thomson and El-Haram (2014) identify as critical to the eventual delivery of truly sustainable buildings, although Schweber acknowledges that positive outcomes depend on each team member's perception of sustainability.

Levett-Therivel (2004) evaluated over 100 existing buildings and concluded that environmental and economic tools overshadow the social dimension of sustainability in the built environment. Several frameworks have been developed related to sustainability within the built environment, specifically in relation to the delivery of sustainable construction projects through communities and enhanced place-making. This forms an important element in the professional and disciplinary background of researchers and practitioners involved in delivering buildings. Amongst this body of literature on sustainable development,

sustainable construction and sustainable communities are a number of seminal works including Long and Hutchins' (2003) mapping of sustainable communities' key attributes, which identified nine principal sustainability features and 49 lower level attributes. This work was placed at the core of both the Housing Corporation and the Office of Deputy Prime Minister's guidelines for the sustainable housing project delivery. The Egan (2004) government's review of the skills required to create sustainable communities alluded to a further 46 sustainability indicators. Treanor and Walker's (2004) mixed method study on behalf of the National Housing Federation, using a combination of secondary data derived from both policy guidance notes and academic outputs, supplemented with primary data collected from the examination of neighbourhood profiling models developed and implemented by five case study organisations, identified over 80 socio-economic indicators for the appraisal of existing neighbourhoods. Yet, Treanor and Walker failed to mention which of the socio-economic variables listed in their framework would be critical to the final project investment decision. Latterly, Turcu (2013) attempted to refine this list of indicators into a shorter more pragmatic set of 26 sustainability indicators by evaluating housing-led regeneration projects. Higham and Stephenson's (2014) synthesis of the above body of work developed the 17 high level sustainability factors listed in table 1, that are categorised into (i) standard, (ii) environmental, (iii) economic and (iv) social factors likely to be manifested at the project level, that can be valued through the multi-phase, multi-criteria framework presented in Treanor and Walker's (2004) work.

Traditional	Environmental	Social	Economic
Quality assessment	Energy efficiency (SAP rating)	Neighbourhood reputation	Demand levels
Condition survey outcomes compared to stock benchmark	Quality of environment	Crime and Anti social behaviour per 1000 population	Future forecasted demand for neighbourhood
Percentage of Decent homes compliance compared to stock benchmark	Other environmental factors	Social exclusion levels per 1000 population	Maintenance costs per dwelling compared to stock benchmark
Aesthetic appearance		Access to services Community cohesion	Life expectancy Other economic indicators
		Mix of community Other societal factors	

Table 1: Seventeen high level sustainability factors (Higham and Stephenson, 2014)

Essa and Fortune (2008) undertook research to resolve the conflicting literature indicated above and confirm the overarching features of sustainability that were required for the delivery of sustainable social housing projects in the UK. Essa and Fortune's work revealed that practitioners concentrated on providing low energy buildings as the principal way to deliver sustainable housing projects, and found that energy, materials selection, pollution and water were the most important indicators whereas those relating to the proposed development's social and economic impact, such as health, wellbeing and transport, were less important. Whilst this work displayed an environmental bias towards sustainability related issues in practitioners' feasibility stage evaluations, it did find that the economic and social aspects of sustainability were also being actively considered in the delivery of social housing projects. However, Cooper and Jones' (2008) results suggested that, whilst the majority of respondents felt that sustainability was an integral aspect of the project feasibility decision-making process, bias towards the use of conventional, finance-based investment toolkits

remained, which indicates that practitioners working in the asset management area within social housing organisations, at that time, continued to favour tools which failed adequately to consider the economic and social aspects of sustainability in feasibility stage project evaluations.

Emmanuel (2012), however, questions the built environment's obsession with sustainability predictor models. In his editorial for the *Built Environment Sri Lanka*, Emmanuel (2012) called for a shift from the development of additional predictor models towards the creation of ex-post evaluative methodologies, against which sustainability performance can be monitored and audited through the project's life cycle. Such an approach, Emmanuel (2012) attests, would provide built environment professionals with an invaluable opportunity for future learning and continuous reflection, whereby increasing sustainable development is indirectly encouraged. Magee *et al* (2012) from RMIT University employed such an approach at an early stage in Australia's development of a Social Sustainability Survey; Dixon's (2012) work, with the Berkeley Group, focused on developing a social sustainability appraisal framework for new housing development; and finally Slater *et al* (2013) worked with the London and Quadrant Housing Association (L&Q) to develop a post-occupancy, social impact assessment tool for regeneration projects. This suggests that, whilst these frameworks provide a suitable mechanism for auditing the social impact of completed projects by evaluating the extent of place-making achieved, they fail to provide adequate feedback about the organisational learning needed to inform early stage decision-making for future projects (Thomson and El-Haram, 2014).

Despite advances in the development of Indicators and Composite frameworks for evaluating sustainability based on value criteria, against which project performance can be predicted, monitored and audited (Emmanuel (2012), a common failing of all these frameworks, models, indicators and toolkits is the fact that they focus on either broad strategic issues or in-depth complexities. Theorists also disagree on the nature and extent of the attributes of the relevant project-related sustainability factors to be measured, and there exist significant conflicts between the models proposed regarding their detail, the measurement and evaluation approach, and the nature of their overarching features, so a suitable structured framework to assist project teams involved in the delivery of sustainable building projects is lacking. Yet, Frame and Vale (2006), Cole (2007) and Rees (2009) suggest that evaluation frameworks provide fundamental building blocks for comprehensive change, by providing practical, transparent and simple to understand criteria to which the industry can respond in manageable steps, thereby empowering construction professionals to think about sustainability in an experiential way, with the safety net of expert guidance, checks and balances (Kaatz *et al*, 2006; Cooper and Symes, 2008; Schweber, 2013). The lack of agreement in the literature reviewed above led Brandon and Lombardi (2011) to conclude that the existing sustainability frameworks, models, indicators or toolkits were insufficiently developed for general application in practice, highlighting the need to identify the extent to which sustainability evaluation models, frameworks, indicators and toolkits are currently been used within the UK social housing sector.

Research Design

Researchers have long debated the relative value of qualitative and quantitative inquiry (Patton, 1990). Qualitative research uses a naturalistic approach that seeks to understand phenomena in context-specific settings whereas quantitative research uses deductive methods

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to test hypothetical generalisations. Each represents a fundamentally different inquiry paradigm, with research actions based on the underpinning philosophical assumptions. Yet despite the philosophical debates of the 1990s (Dainty, 2008) construction management research continues to reside in an arguably scientific epistemology typified by quantitative research. Having emerged from the positivist branch of philosophy, quantitative research follows a systematic process in order to gather, measure and quantify numerical data (Cormack, 2002), through the use of data collection methods such as questionnaires, documents and observations (Parahoo, 2006), whereby inquiry into social and human problems is based on testing hypothesis or theory composed of variables, measured with numbers and analysed using statistical procedures to determine whether the hypothesis or theory holds true (Naoum, 2012).

As with previous studies examining industry practice (Deakin *et al.*, 2002, Fortune and Cox, 2005, Carter and Fortune, 2007, Essa and Fortune, 2008, Cooper and Jones, 2008) the need to ascertain the extent of the use of sustainability evaluation toolkits as an early stage project evaluation tool called for a quantitative research design that made use of a measuring instrument that allowed data to be collected from a large number of practitioners in the field. Punch (1998), Creswell (2003) and Fellows and Liu (2008) all indicate that the most appropriate data collection tool to use for such research is the questionnaire survey. The design and use of such an instrument enabled the study not only to ascertain the extent of the use of sustainability evaluation toolkits, but also uncover the significant features of sustainability deemed essential for the evaluation of social housing projects. Following the piloting of the questionnaire, based on the mathematical appraisal of sample sizes outlined by Fellows and Liu (2008), it was resolved to develop a stratified sample random sample of 481 organisations. The sample was systematically selected from the overall population established based on the Housing Corporation's (2011) register of social housing providers using the Homes and Communities Agency (HCA) statistical return for 2014 as a guide to the approximate distribution of organisations by size within the population. Fink (2013) advises the adoption of stratified random sampling allowed the researchers more control over the eventual sample to ensure it reflected the various groups and patterns that characterise the overall population whilst also minimising the possibility of bias by ensuring every item of the population had an equal probability of being selected.

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~~Punch (1998) argues that the research approach adopted for a study should reflect the nature of the research problems identified and the research paradigm used in the previous work on a topic. In light of the aims of the current project and findings from the literature review regarding the nature of the previous work on this topic, it was resolved to adopt a pragmatic research approach. A quantitative research design was developed that made use of a measuring instrument to collect data from a large number of practitioners. Creswell's (2003) rationale for selecting appropriate quantitative tools indicated that a questionnaire survey was the most appropriate data collection tool for this study. The survey's population (n:2101) was established based on the Housing Corporation's (2011) register of social housing providers. Following the piloting of the questionnaire, based on the mathematical appraisal of sample sizes outlined by Fellows and Liu (2008), it was resolved to develop a random sample of 481 organisations~~

The survey instrument, a postal questionnaire, was designed to be of minimal length in order to encourage a higher than average response rate. The frameworks included in the survey were those indicated in the literature, although a second review was undertaken to ensure their appropriateness and alignment with the study's aim, This process eliminated 21 of the identified frameworks, due either to a lack of current information regarding how they were to

be applied or their lack of suitability to the social housing sector. As a result, only the 13 frameworks identified as being the closest to meeting the overall aim of the study were included in the final survey instrument. These were grouped under the following headings:

- *Monetary Tools*
- *Sustainability Indicators and Composite Models*

The data to be collected were either nominal or ordinal in nature to facilitate easy responses and the later statistical analysis. Accordingly, the respondents were asked to indicate: biographical details about the nature of their employing organisation; if their organisation had, or was developing, a corporate policy for the implementation of sustainable construction; which frameworks they actually used in practice; scores for the frequency of their use from 1 (low) to 3 (high); and, finally, the importance of 17 potential high level indicators of sustainability using a scale from 1 (low importance) to 5 (high importance). The measures adopted to increase the survey's response rate were as follows: the survey instrument was sent out, with a covering letter explaining the research purpose, aims and objectives to a pre-determined person within the organisation, together with a stamped addressed envelope. Each questionnaire had a reference number to allow a targeted follow-up letter to be issued in the case of non-response a fortnight after the initial mailing. The overall response rate was 24% (n=116), which was deemed satisfactory, given the previously reported response rates of 12% and 15% for similar unsolicited mailed surveys in the social housing sector (Albanese, 2007; Cooper and Jones, 2008).

Results and Analysis

Survey Respondents

Thirty-eight of the responses received were excluded from further analysis because: they provided incomplete data; they were incorrectly addressed; or the recipients had been unwilling to respond. The three survey questions asked the respondents to classify their organisation using the typical classifications identified in the academic literature, and to identify the year when their organisation was formed, based on the generational clusters identified by Pawson and Fancy (2003):

- *Pre-1989 organisations* - typically founded due to philanthropic motivation.
- *1989–1999 organisations* - formed following changes to the management and financing of local authority stock outlined in both the 1988 Housing Act and 1989 Local Government and Housing Act.
- *Post-2000 organisations* - private social providers formed as a result of local authorities accepting government funding to write off housing debt.

Finally, the respondents were asked to state the size of their housing stock at the time of the survey. The respondents were found to be distributed as follows: Registered Social Landlords (58%), Housing Associations (33%) and Arms length management organisations (9%). The results of questions two (organisational maturity) and three (scale of operation) are shown in Tables 2-3. Table 3 indicates that the respondents' demographics do not correspond to the profile of PSPs reported in the Homes and Communities Agency's (HCA) statistical release for 2014/15. A higher than expected proportion of the responses was received from organisations owning over 5,000 units. Whilst this may be the result of sample bias, it is noteworthy that the latest HCA statistical return (HCA, 2015) shows that, collectively, these organisations control over 90% of the UK housing stock, suggesting that they may have felt better placed to respond to this survey.

	Frequency	Percentage
Pre-1989	29	37.18
1989-1999	15	19.23
Post-2000	27	34.62
Unsure	7	8.97

Table 2: Organisational maturity

	Percentage by units owned			
	>1,000	1001-5000	5001-10,000	>10,000
ALL	91.0%		4.1%	4.9%
Survey Respondents	21.8%	24.4%	24.4%	29.5%

Table 3: Profile of survey population against respondents

Appraisal toolkits selection and use

The survey included the frameworks identified from the previous literature as follows: ‘life cycle and capital cost analysis’, ‘net present value’, cost benefit analysis’, ‘social return on investment’, ‘internal rate of return’, social impact assessment’, ‘national housing federation framework’ developed by Treanor and Walker (2004), ‘Eco-Homes XB’, and ‘social capital studies’, alongside two further categories of ‘commercially developed proprietary systems’ which includes the ‘Property Reinvestment Strategy Model’ (PRISM) developed by the William Sutton Housing Association and subsequently adopted widely by the sector (Humphries, 2003), and finally ‘bespoke in-house systems’.

The results (see Table 4) show that, in terms of the incidence in-use of the listed toolkits, the conventional, finance-based toolkits such as Life Cycle Cost Analysis, Capital Cost and Discounted Cash Flow (using NPV) continue to be the tools most frequently used in project investment decision-making practice. The survey reveals that the newer, more sustainability-led tools are in use but are not as yet generally adopted in practice, and also that the least used models were those developed specifically to address the wider socio-economic implications of future investment schemes such as the National Housing Federation Framework, Eco Homes XB, Social Capital Studies, Proprietary System and P.R.I.S.M.

It can be seen that the frameworks, models and toolkits that are grouped together and labelled as traditional are clearly those that are in everyday use by the overwhelming majority of respondents and, as such, were the most commonly used models found in the survey. For instance, capital cost modelling, life cycle modelling and discounted cash flow were used by over 70% of the respondents and so were the most widely-used frameworks found in this survey. Of the models identified in the literature as being employed for sustainability evaluation, it can be seen in Figure 1 that only cost benefit analysis (72%), social return on investment (67%) and the in-house systems (59%) were used by a significant proportion of the survey respondents.

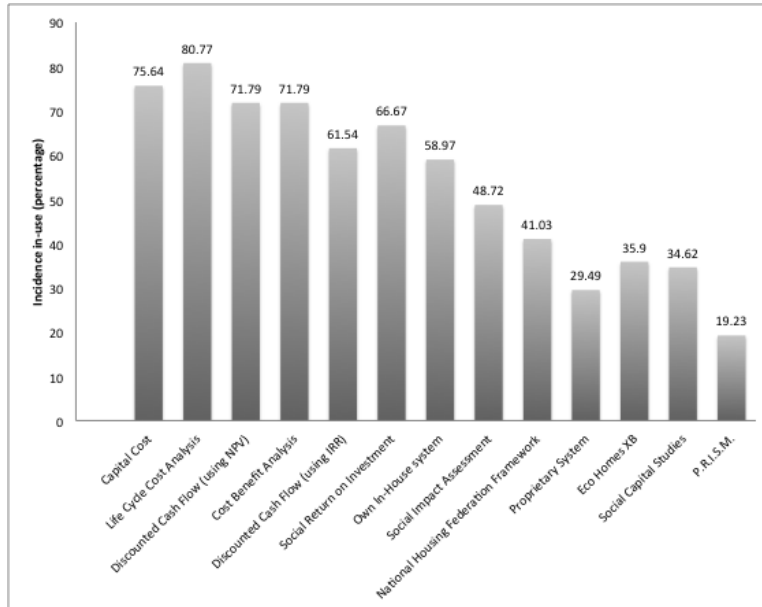


Figure 1: Sustainability appraisal framework usage in the UK Social Housing Sector

The survey also revealed a strong relationship between the models and toolkits in general use and practitioners' perceptions of their usefulness and utility. In line with the literature review findings, based on more conventional practice, Table 4 shows that, according to the survey respondents utility scores for each model, the most conventional toolkit, namely the capital cost model, is the most useful. However, those organisations that make use of their own in-house and proprietary systems rate them as being useful even though they are not in general use amongst the survey respondents and hence have low overall utility scores.

Appraisal Models	Incidence in Use N=78 (%)	Usefulness In Practice			Mean Rating	Std. Dev.	Utility Score (Incidence Nr x Rating Avg)
		Low (1)	Moderate (2)	High (3)			
Capital Cost	75.64	3	10	46	2.06	1.272	161.1
Life Cycle Cost Analysis	80.77	6	25	32	1.95	1.127	151.8
Discounted Cash Flow (using NPV)	71.79	8	11	37	1.81	1.300	141.1
Cost Benefit Analysis	71.79	10	20	26	1.64	1.216	128.2
Discounted Cash Flow (using IRR)	61.54	15	15	18	1.27	1.203	98.9
Social Return on Investment	66.67	14	29	9	1.27	1.053	98.8
Own In-House system	58.97	6	9	30	1.51	1.393	116.8
Social Impact Assessment	48.72	17	13	8	1.06	1.061	66.9
National Housing Federation Framework	41.03	11	17	4	0.73	0.976	57.0
Proprietary System	29.49	3	8	12	0.71	1.163	52.6
Eco Homes XB	35.90	17	9	2	0.53	0.801	40.9
Social Capital Studies	34.62	16	10	1	0.50	0.769	38.9
P.R.I.S.M.	19.23	13	2	0	0.22	0.474	17.0

Table 4: Sustainability appraisal tools In-use in the UK Social Housing Sector

Higham and Fortune's (2011) exploration of the sector through in-depth interviews with leading proponents of sustainability suggested that the nature of social housing organisations, in terms of both their operational scale and commercial maturity, materially affects their propensity to evaluate sustainability during the early phases of project development, given the organisation's ultimate need to trade sustainability off against other competing commercial objectives critical to the survival of the business. As a result, it was resolved to conduct an analysis of the data to see whether, as suggested by Higham and Fortune (2011), a statistically significant relationship existed between an organisation's scale and maturity and its propensity to evaluate sustainability during the early phases of project planning. The collected data were not uniformly distributed and therefore a Chi-Square test was conducted to establish if any relationship existed, followed by a Cramer's V test to establish the relative strength of any identified relationship. The Chi-square test revealed the existence of relationships between organisational size and all of the identified frameworks, although only the correlation between *cost planning* and *organisational size* was statistically significant ($\chi^2(9) = 18.488$, $p = 0.03$ (two-tailed)). The Cramer's V test revealed that the strength of the association was low ($V=0.270$). Overall, the results suggest that organisational size does not influence the propensity to adopt sustainability evaluation frameworks. Similarly, no statistically significant relationship was identified between organisational maturity and the use of sustainability evaluation frameworks. Yet, the results revealed that, rather than appraising the commercial viability of a project based on the initial capital outlay, the more established organisations sought to appraise this in terms of an asset's expected life cycle, with the Chi-square test revealing a statistically significant relationship between the use of life cycle modelling and organisational maturity ($\chi^2(9)=17.089$, $p=0.047$ (two-tailed)). However, once again, the Cramer's V test found this association to be weak ($V=0.270$). In

general, there was no difference among either the three organisational classes of maturity, or indeed amongst the four classes of organisational size classified in the survey based on the test scores. As a result, it can be asserted that a social housing provider's both maturity and size does not impact on the incidence in-use of the early stage sustainability evaluation frameworks listed in the survey.

Significant Sustainability indicators

The survey respondents were asked to consider a number of principal indicators of sustainability that were identified in the literature as being important to housing projects. To assist in these sustainability dimensions' appraisal, the respondents were also asked to rate the importance of three standard indicators, namely design aesthetics, decent home compliance, stock condition and housing quality, which are adopted by practitioners in the sector as a matter of course. A likert scale was used for the responses, which ranged from irrelevant (0) to extremely important (5), as shown in Figure 2.

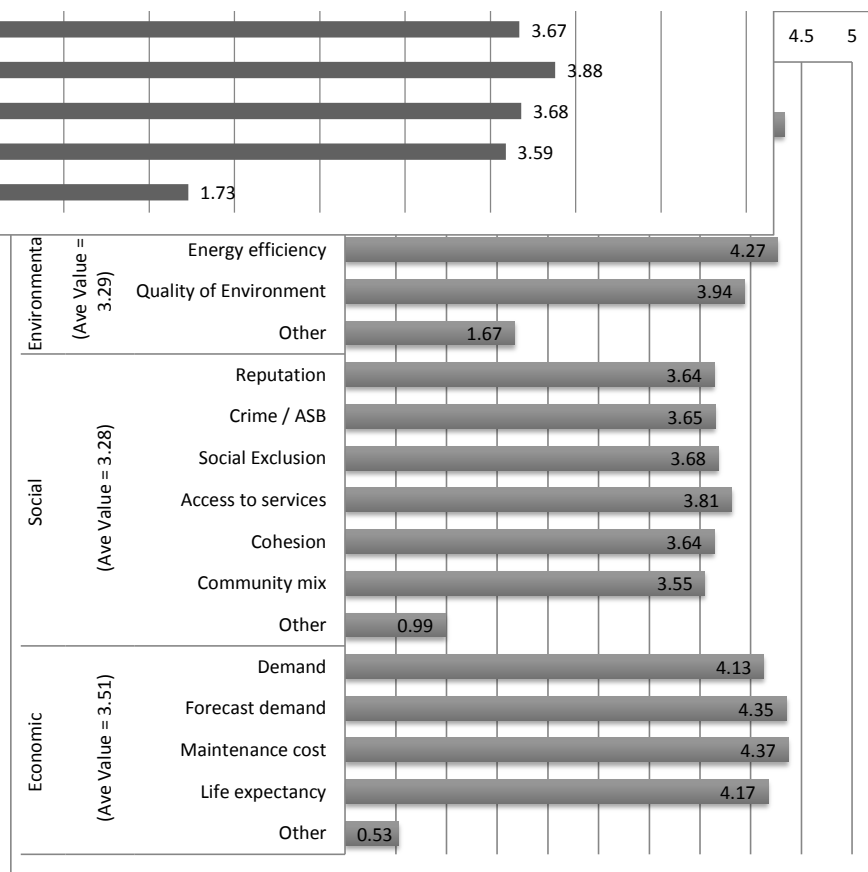


Figure 2: Significant sustainability indicators in the Social Housing Sector (0= Irrelevant 5 =extremely important)

Figure 2 shows that the factors relating to energy efficiency, asset life expectancy, condition survey and demand were regarded as more important than the other factors listed on the questionnaire. ~~As figure 3 shows, This result highlights that the more conventional economic factors (average score 3.5152) are perceived as more important than the social (average score 3.2828) or environmental factors (average score 3.2929) in housing projects' feasibility stage investment decisions. However, the results in Figures 2-3 further revealed show that all of the aspects of sustainability listed in the survey were important within the overall investment decision-making process, which indicates that practitioners within this sector are aware of the need to incorporate the broader principles of social and economic inclusion into potential social housing projects even though such broader issues of sustainability are less important at present. The survey results confirm that practitioners focus on providing low energy buildings when considering stock refurbishment as the principal way to deliver sustainable housing projects. These findings confirm those of Hall and Purchase, (2006) and Essa and Fortune, (2008): that the social housing sector's engagement with sustainability focuses on the delivery of environmental sustainability in its social housing refurbishment projects.~~

Although sustainable construction is clearly on the UK government's agenda, with a succession of top-down policy documents published over the last decade calling for increasing levels of industry engagement with sustainability generally, particularly with regard to the social housing sector, in order to monitor progress towards the general adoption of broader sustainable practice. Rees (2009) argues that this requires both top-down policy change within the organisation to provide leadership, alongside extensive bottom-up innovation through cultural change, yet earlier UK social housing sector surveys have identified both a lack of detailed policy development needed to facilitate the implementation of sustainable development (Carter and Fortune, 2007) alongside limited bottom-up innovation exhibited through positive changes in the way that sustainability is introduced and evaluated at project level (Cooper and Jones, 2008).

Cooper and Jones' (2008) found a clear reluctance among social housing maintenance managers to appraise the full range of sustainable benefits at the project feasibility stage, with respondents favouring the use of conventional toolkits or, at best, those focused on the stock's potential energy usage. Whilst these findings are to an extent replicated in this study, which indicates that the more traditional two-dimensional approaches to project appraisal (principally grounded in economics) are, in general, still the most widely used in practice, our survey found that, despite the extensive array of sustainability indicators and composite frameworks developed post-Brundtland (Horner 2004; Levitt-Therivel 2004), including those specifically developed for the social housing sector (Carter and Fortune 2007), these are not routinely used in practice. Instead, construction professionals, when evaluating social housing projects' sustainability, routinely adopt monetary tools, such as cost-benefit analysis and social return on investment, rather than sophisticated multi-criteria composite frameworks capable of facilitating a comprehensive evaluation (Brandon and Lombardi, 2011). This suggests that Bell's (1981) call for a "paradigm shift" towards the general evaluation of social housing interventions based on multiple attributes, rather than solely on the project's economic merits, remains valid. Whilst this finding may raise important questions about the future direction of sustainable evaluation framework development, the survey also revealed that social housing organisations exhibit a strong propensity to develop bespoke sustainability evaluation methodologies. In fact, Wilkies and Mullins' (2012) contend that 35% of the frameworks that social housing providers used to evaluate social impact were bespoke to that organisation. The results of this study, combined with the findings of Cooper and Jones

(2008) and Wilkies and Mullins (2012) add weight to Brandon and Lombardi's (2011) assertion that sophisticated, composite frameworks remain insufficiently developed for general practical application.

To establish whether Bell's (1981) "paradigm shift" towards the general evaluation of social housing interventions based on multiple attributes, rather than solely on the project's economic merits had been delayed, abandoned or is in progress, the final research objective was to test the 17 high level sustainability features identified in the literature as being potentially significant to social housing providers when evaluating potential schemes. The survey respondents were asked to rate these features in terms of their significance, conventional economic determinants, linked to commercial viability, were identified as being fundamental to driving projects forwards. Practitioners working within the sector are aware of the need to incorporate the broader principles of social and economic inclusion into potential social housing projects but, at present, these broader sustainability issues are less important, suggesting that Bell's (1981) call for transformation may yet be realised.

Conclusions

This work identified the types of sustainability evaluation frameworks found to be in actual use by built environment practitioners working in the UK social housing sector. In general, the sophisticated multi-criteria composite frameworks capable of comprehensively evaluating sustainability, developed predominantly post-Brundtland, were not found to be in widespread use. The continued overwhelming use of conventional or traditional financial appraisal frameworks, alongside internally-developed, bespoke evaluation ones and monetary tools, such as cost-benefit analysis and social return on investment, which ultimately seek to measure costs and potential benefits associated with a sustainable approach to development based on the evaluation of the aggregated welfare attained, as determined through the analysis of market transactions and price, suggests that Bell's call for a paradigm change in the evaluation of social housing projects remains unanswered, irrespective of organisational characteristics related to size, de-nomination and maturity. This finding supports Fortune and Cox's (2005) previous work, and also adds weight to Brandon and Lombardi's observation that most of the multi-criteria, composite frameworks capable of comprehensively evaluating sustainability are "either incomplete or totally unstructured" and, in either case, impossible to implement. The limitations of the survey instrument, however, prevented the identification of the reasons for the continued non-use of models generated by research in this field.

Despite these limitations, our survey identified the more significant features of sustainability that practitioners perceived as necessary to evaluate when making sustainability-led decisions for UK social housing projects. The results show that practitioners are still concentrating on providing low energy housing as a principal way to deliver sustainable projects, but are now attempting to evaluate the wider social and economic factors related to sustainable social housing projects, although these decisions appear to lie outside the operation of the frameworks specifically developed to ease this process. Although our findings are inconclusive, it appears that the frameworks designed to provide essential building blocks for the delivery of sustainable construction are increasingly seen as a barrier to its realisation. Further work in this area is therefore needed related to sustainability-led social housing project appraisal in order to refine the existing frameworks and ultimately enhance stakeholder prosperity.

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